Summary of International Performance Measurement and Verification Protocol (IPMVP) Option B for New Buildings:

To use IPMVP Option B for new buildings, parties typically stipulate baseline energy consumption using a computer software energy simulation tool such as DOE-2.1. Projected energy savings are then developed based on proposed energy conservation measures and design strategies incorporated into the simulation tool analysis. After the building is built and occupied for a specified period of time, energy savings projections are adjusted by calibrating the simulation tool analysis to actual operating conditions using data from metered energy conservation measures.

Energy efficiency measures chosen to be metered can be any factor that materially affects the generation of savings. Operating hours and power draw over a period are typical examples of measured variables. Increased metering complexity produces higher verification accuracy at the expense of measurement and verification (M & V) cost. Using statistical sampling of similar multiple end-use points (such as motors or lamps) may be more appropriate for simple systems. Use of short- or long-term metering data typically depends on the constancy and/or predictability of the load. Another valuable aspect of metering to consider is that that metering provides long-term persistence operation data that can be used to improve or optimize the operation of equipment on a real-time basis.[*]

Basic Steps to Implementing the IPMVP:

1. Define baseline and estimate energy performance. For LEED purposes, this is a building complying with ASHRAE/IESNA Standard 90.1-1999.
2. Define energy efficient design (energy conservation measures (ECMs)) and calculate initial savings estimate. This is a comparison of energy performance of baseline building and energy efficient building using the estimating tool.
3. Define general measurement and verification approach (data collection plan) during early project design phases. LEED specifies use of Option B for new buildings. (See IPMVP Chapter 6).
4. Verify installation and commissioning of ECMs.
5. Determine savings under actual post-installation conditions. Initial savings estimates are modified to account for as-built verified conditions and calibrated with monitoring data of operating conditions.
6. Re-evaluate at appropriate intervals. Typically performed annually after the first year of operation.

Additional Notes on Successful Specification and Use of the IPMVP:

Successful use of the IPMVP and the specification of a M & V method (e.g. IPMVP Option B) requires at least the following:

- State the document to be referenced, e.g. the IPMVP.
- State which option and method from the document will be used, e.g., Option B with post-installation metering of operating hours.
- Indicate who will conduct the M & V.
- Define the details of how calculations will be made.
- Specify metering to be conducted including information on the equipment, calibration, location of measurements, metering period, etc.
- Define key assumptions to be made about significant variables or unknowns.
- Define the level of accuracy to be achieved, if not for the entire analysis, at least for key components;
- Indicate how quality assurance will be maintained and repeatability confirmed.
- Indicate reports to be prepared, their contents, and when they are to be provided.

Note on Energy Estimating/Simulation Tools:

It is expected that mutually agreed upon, widely accepted, and validated computer-based estimating tools will be used, such as those software tools suggested in Section 4 of Reference Standard 29 of the Washington State Energy Code. Typically, more complex or demanding analysis will produce more precise analyses upon which to measure energy conservation measure and design strategy performance.

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[*] By using metering data to commission and optimize the performance of building systems, the City of San Diego's 73,000 square foot Ridgehaven office building has been able to reduce its kWh per square foot load from an already phenomenal 9 kWh at initial occupancy in 1996 to an amazing 6.5 kWh in 1999, saving the City over $80,000 per year in energy costs.